SB608
P65
F5
NO. 46

1940
Indexed

347
432.1

Number 46

Tree Pest Leaflets

THE ARBORVITAE LEAF MINERS

(Yponomeutidae and Gelechiidae)

Prepared by A. E. BROWER, Assistant State Entomologist, Maine Forest Service.

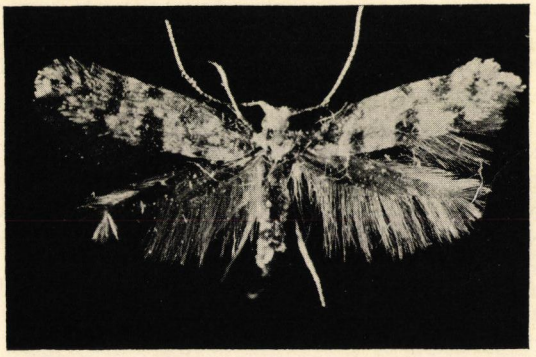

Figure 1. **ARGYRESTHIA THUIELLA** Packard.
Adult (much enlarged)

Issued jointly through the cooperation of the following agencies:

The State Foresters, State Departments of Agriculture, State Agricultural Experiment Stations, Extension Services, Forest Schools, and Forest and Park Associations of New England and New York, and the Northeastern Forest Experiment Station of the Forest Service, the Division of Forest Pathology of the Bureau of Plant Industry, and the Division of Forest Insect Investigations of the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture.

Edited by a Committee of the SOCIETY OF AMERICAN FORESTERS, NEW ENGLAND SECTION, and published for the cooperators by the Massachusetts Forest and Park Association, 3 Joy Street, Boston.

July 1940

THE ARBORVITAE LEAF MINERS

(Yponomeutidae and Gelechiidae)

Leaf miner injury to arborvitae has been recorded by many workers in the seventy years since Packard described and recorded *Argyresthia thuiella* as injuring arborvitae. Four species of tiny moths are now known to participate in this injury. Their larvae or caterpillars are miners throughout the larval period. Each species has one generation annually. The larvae of all four species are typical caterpillars unlike the highly modified or degenerate larvae of most leaf miners; and they may leave a mine in one branch to enter another branch. Leaf miners generally confine their work to one leaf or at the most to two or three leaves. Arborvitae leaf miners could be more properly termed leaf and twig miners since each larva mines many of the tiny scale-like leaves and surface of the branches. Usually two or three species are associated when injury occurs, one of them chiefly responsible for it. Packard's biological notes show he confused two species, and uncertainty concerning the biology and the effectiveness of control measures still exists. In addition to the definite hosts given under each species, characteristic mines have been collected from southern white cedar, (*Chamaecyparis thyoides* L.) in Maine.

Symptoms of Damage: — The damage is apparent as translucent or straw-colored, and later, dark brown, mines which start near the tip of a branchlet and extend to include other branchlets or run along the central branch. Death of the branchlets from other causes is often confused with leaf miner damage, but the mined-out interior is definite proof of leaf miner work. The injury begins in the summer and reaches a maximum in the fall with completion of most of the feeding. Extension of the mines toward or along the main branches often prevents the sap from reaching the terminal portions and causes them to die. This injury in the terminals is conspicuous and particularly objectionable on ornamentals. Numbers of tiny flitting moths may call attention to the cause of the injury. On the foliage the Argresthias crawl swiftly about turning first one way and then the other, or rest with the wings closely drawn to the body. They rest with the front legs extended, the middle legs beneath, and the hind legs with the body inclined forty-five degrees upward.

Small, rapidly growing arborvitae are not favored but otherwise all ages are attacked. Injury may be severe in most locations; heavy damage occurring in nurseries, on ornamentals, in forests and swamps, but trees growing under thick timber seem less favored. The injury may continue until trees are badly defoliated and apparently die from the attack.

ARBORVITAE LEAF MINER

(*Argyresthia thuiella* Pack.)

This species was described by Packard in 1871 as a serious enemy of arborvitae and has continued to be important as a pest on nursery and ornamental trees and other trees growing in exposed locations. It is widely distributed east of the Rocky Mountains.

Host Trees: — Arborvitae (*Thuja occidentalis* L.) also called northern white cedar is the host. *Juniperus utahensis* Engel is also reported attacked.

Description of larvae: — The larvae are yellowish or grayish white in color with brown head and shield-shaped area back of head, and are about one-eighth inch long.

Life History: — The moths begin emerging the end of May in Connecticut and about two weeks later in central Maine, emergence continuing for three to four weeks with stragglers over a longer period. The barrel-shaped, reti-

culate, yellowish white eggs are usually wedged in the axils of the branchlets; some being stuck under the tips or along the margins of the scale-like leaves. The eggs hatch in about 18 days. The newly-hatched larvae bore straight into the leaves to near the opposite surface before turning the mine, rejecting the borings and leaving the hole plugged. Later part of the frass is ejected from larger holes. A common place for entrance is about three-eighths inch below the tip, which dies, and the mine extends downward entering other branchlets as needed. Larvae are fully grown or nearly so by fall. They clean out a section of the mine and line it with silk for the winter. In the spring pupation occurs in the mine.

Argyresthia freyella Wlshm.

This species was described from Texas. It ranges throughout most of the eastern United States and into Canada. Both red cedar and arborvitae are sometimes heavily attacked. In New England it is not so often recorded injuring nursery and ornamental trees as *A. thuiella* Pack.

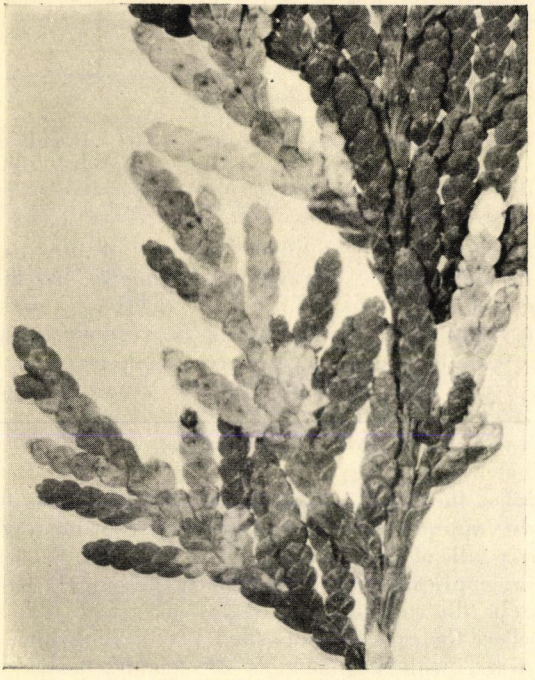

Figure 2. ARBORVITAE LEAF MINER. Mines.

Host Trees: — Red cedar (*Juniperus virginiana* L.) and arborvitae (*Thuja occidentalis* L.) are the host trees.

Description of the larvae:—No differences between the larvae of this and *A. thuiella* Pack, have been recorded.

Life History: — The moths appear in central Maine from early in June until mid-July, in greatest numbers the last half of June. The eggs are probably laid as in *A. thuiella* Pack. The larval mines of this or the next species, or both of them, are often more extended along the main branch and not so largely confined to the branchlets. The larvae are apparently full-grown by winter. A portion of the mine is cleaned out and lined with silk for the winter. In the spring they come out of the mine and spin elongate tapering grayish-white cocoons on the leaves or branches. The moths of this and the next species are much like *A. thuiella* Pack, except that the markings consist of two elongate basal and three or four transverse, irregular broad golden bands.

Argyresthia new species

This apparently undescribed species is closely similar to *A. freyella* Wlshm. It is widespread in Maine and in one area has produced important injury to trees in the forest.

Host Tree: — Arborvitae (*Thuja occidentalis* L.) is the only known food plant.

Description of larvae: — No way is known of separating the larvae of the three species of *Argyresthia* on arborvitae.

Life History: — It is like that of *A. freyella* Wlshm. so far as is known. Emergence of the moths is over a long period in June and July. The cocoon is larger and whiter.

Recurvaria thujaella Kft.

This is an important species from New Jersey north and eastward in nurseries, on ornamentals and in the forest.

Host Tree: — Arborvitae (*Thuja occidentalis* L.) is the only recorded host.

Description of the larvae: — The larvae are grayish or greenish-white becoming decidedly pinkish in the later stages, with prominent dark blackish-brown head and cervical shield, the area back of the head. They are about one-fourth inch long when mature.

Life History: — In central Maine the moths begin emerging late in June and continue to the end of July. The eggs are laid along the edges of the scale-like leaves. The larvae consume more food than the smaller *Argyresthia*. The winter is passed in a silk-lined portion of the mine. When spring comes feeding is resumed, unlike the *Argyresthia* which seem to feed little or none at that time. With the resumption of feeding the old mine is abandoned and they enter a fresh branch. Pupation is in the mine.

CONTROL

In the Forest: — Many species of hymenopterous parasites have been reared from the larvae in the course of studies on these moths. When outbreaks develop parasites and other natural factors generally destroy so many of the leaf miners that forest trees are not seriously injured.

In Nurseries and on Ornamentals: — The published results of spraying experiments are meager and unsatisfactory. Spraying experiments by the author against the larval stages using various dilutions of the best known contact sprays gave no definite kill or too low a kill to be recommended. Nicotine sulphate applications to kill the exposed eggs gave a high percentage of kill. Sprays should be timed from 14 to 18 days after the appearance of the first moths. The moths of *Argyresthia* live for 10 to 12 days and the egg period is about 18 days. *Recurvaria* live 11 to 14 days, and the eggs probably require as long or longer to hatch than *Argyresthia*. The injury is often produced by more than one species, the moths appearing at different times to lay their eggs. One well-timed application will give effective control if applied at the time when nearly all of the eggs have been laid. If two species are involved two or more applications about eighteen days apart will be required. The spray should be directed against the lower surface of the foliage and the small branches where the eggs are deposited. Nicotine sulphate one quart in 100 gallons of water with 1½ pounds of laundry soap or other spreader is recommended.

REFERENCES

Britton, W. E. and M. P. Zappe. An Outbreak of the Arbor Vitae Leaf Miner *Argyresthia thuiella* Pack. In Twenty-first Report State Entomologist of Connecticut 1921. Conn. Agr. Expt. Sta. Bull. 234 pp. 157-160, 1922.

Busck, A. *Argyresthia freyella* Walsingham and *Argyresthia thuiella* Packard. In Revision of the American Argyresthia. Separate, Proc. U. S. National Museum Vol. 32, no. 1506, pp. 11 and 23, 1907.

Felt, E. P. Arbor Vitae Leaf Miner, *Argyresthia thuiella* Packard. In Twenty-ninth Report State Entomologist of N. Y., 1913, p. 22, 1915.

Herrick, G. W. The Arbor-Vitae Leaf Miner, *Argyresthia thuiella* Pack. In Insect Enemies of Shade-Trees. Comstock Pub. Co., Ithaca, N. Y. pp. 356-358.

Kearfott, W. D. *Recurvaria thujaella*, sp. nov. In Descriptions of New Tineoidea. Journal N. Y. Ent. Soc. Vol. 11:154-155, 1903.

Packard, A. S., Jr. The Cedar Tineid. In First Report on the Injurious and Beneficial Insects of the State of Massachusetts. Eighteenth Ann. Rept. Mass. Board of Agr. for 1870, pp. 372-374, 1871.